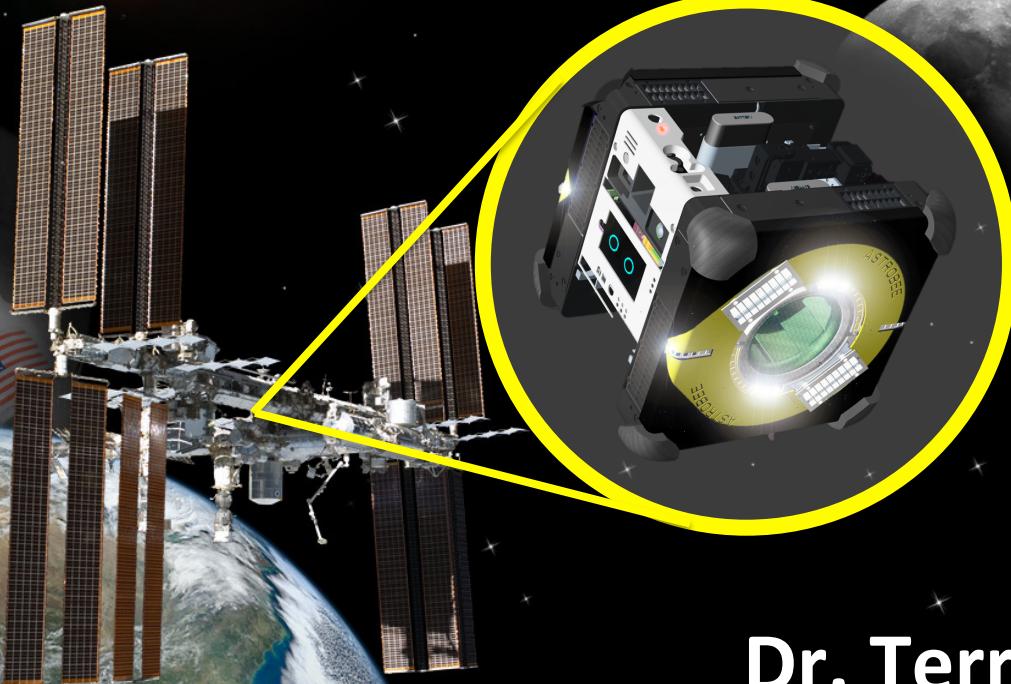


# Astrobee

A free-flying robot for the International Space Station

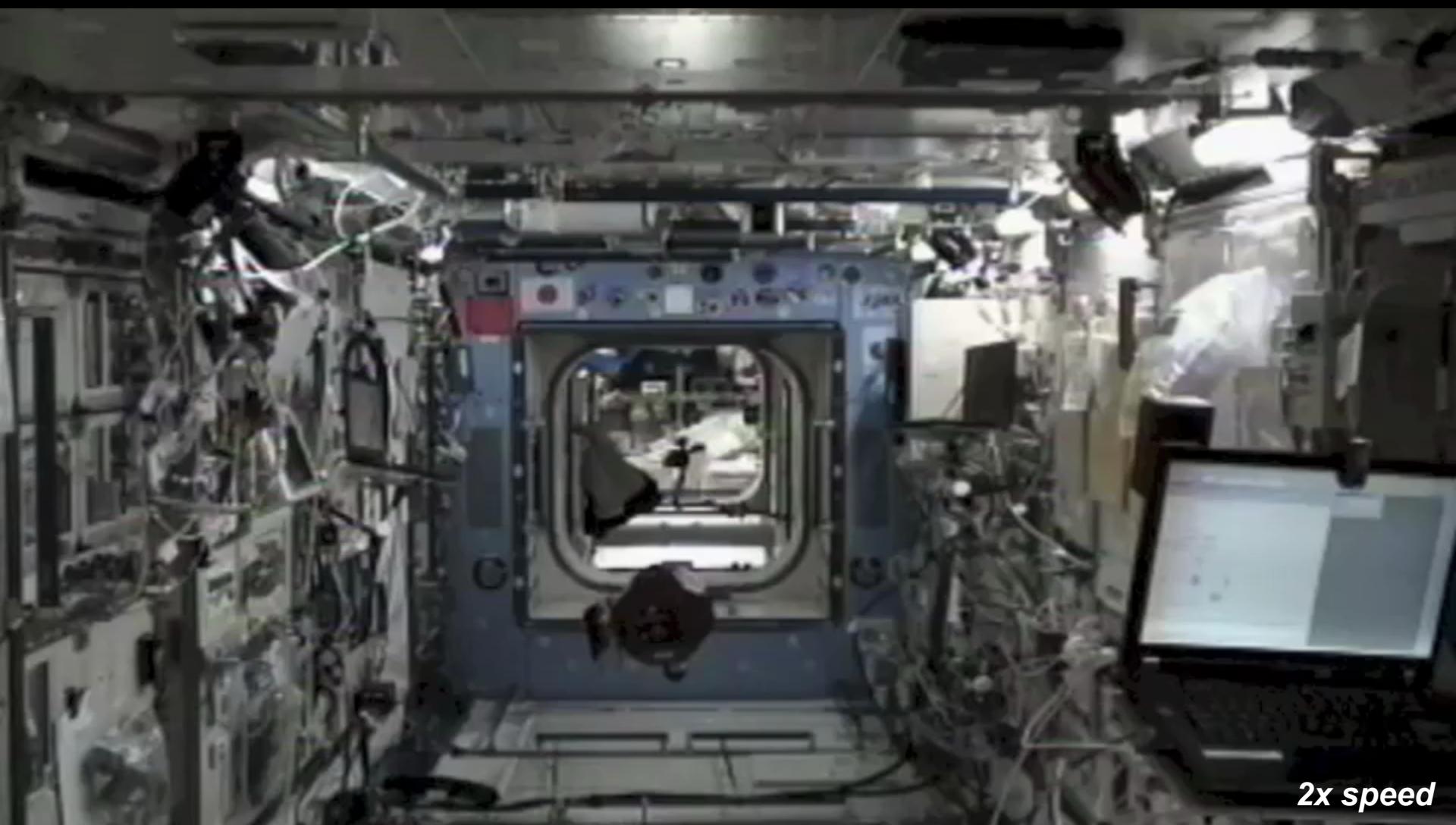


**Dr. Terry Fong**

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NASA Ames Research Center  
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**A long time ago, in a galaxy  
far, far away...**

# Remote Control of SPHERES



December 2012

*Crew: Kevin Ford, Expedition 33 Commander*

# Astrobee IVA Free-Flying Robot



## Key Facts

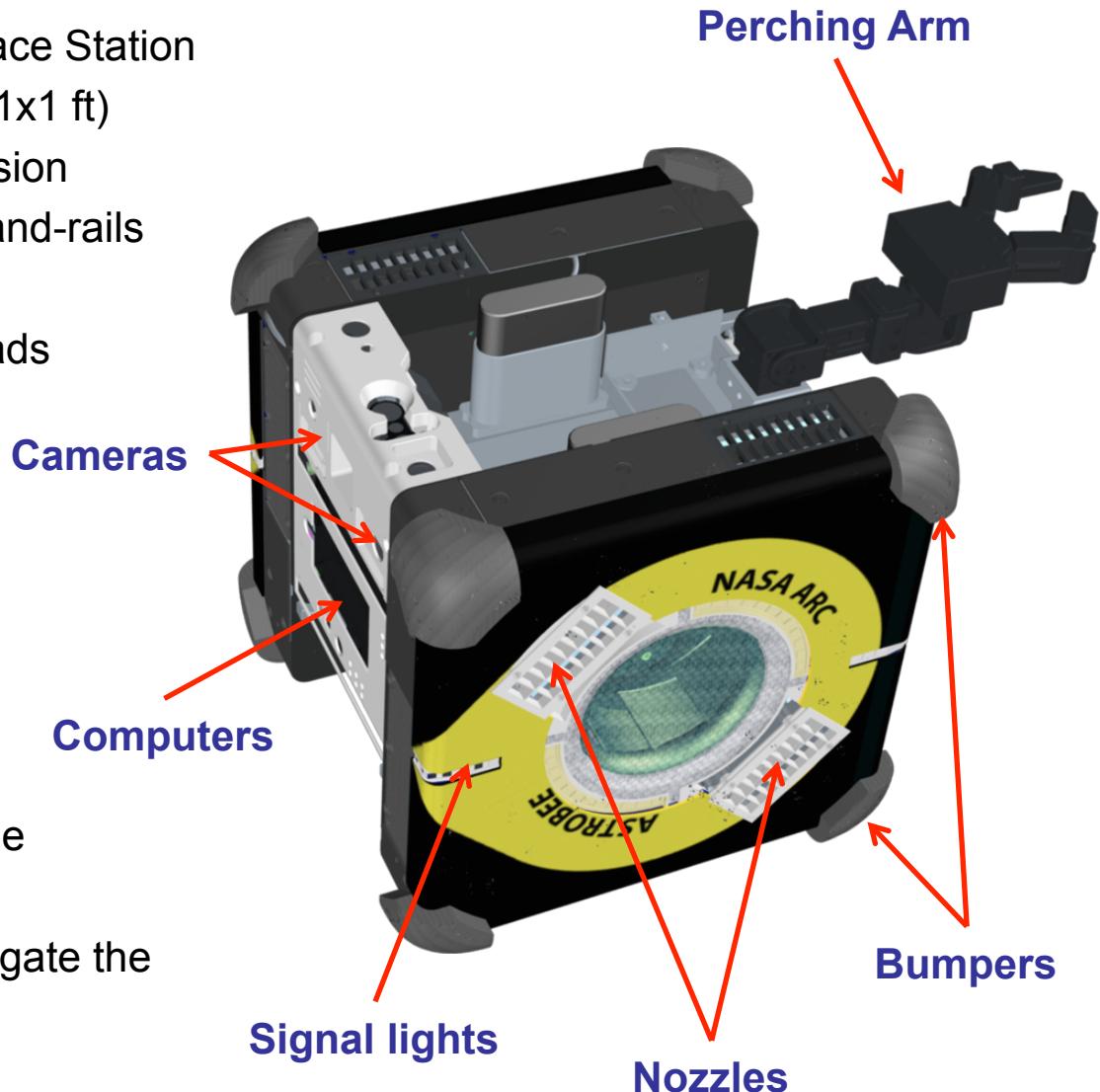
- Free flying robot **inside** the Space Station
- Size: 30x30x30 cm (approx. 1x1x1 ft)
- **All electric** + fan-based propulsion
- Robot arm for “**perching**” on hand-rails
- Three **smartphone** computers
- **Expansion port** for new payloads
- Open-source software

## Uses

- Mobile sensor
- Remotely operated camera
- Zero-G robotic research

## New Technology

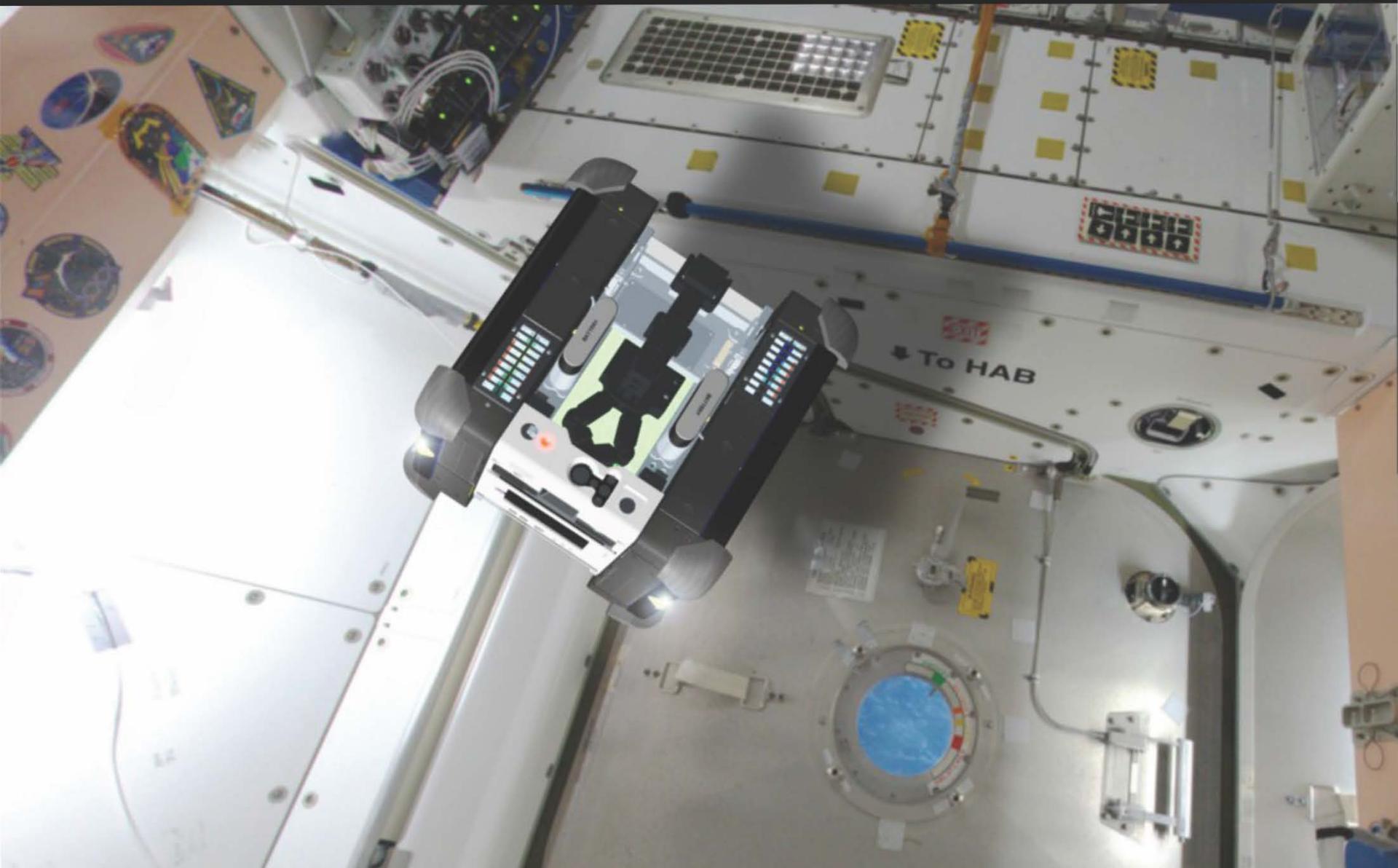
- Autonomous docking & recharge
- Autonomous perching
- Uses on-board cameras to navigate the Space Station



# Astrobee on the Space Station (concept)



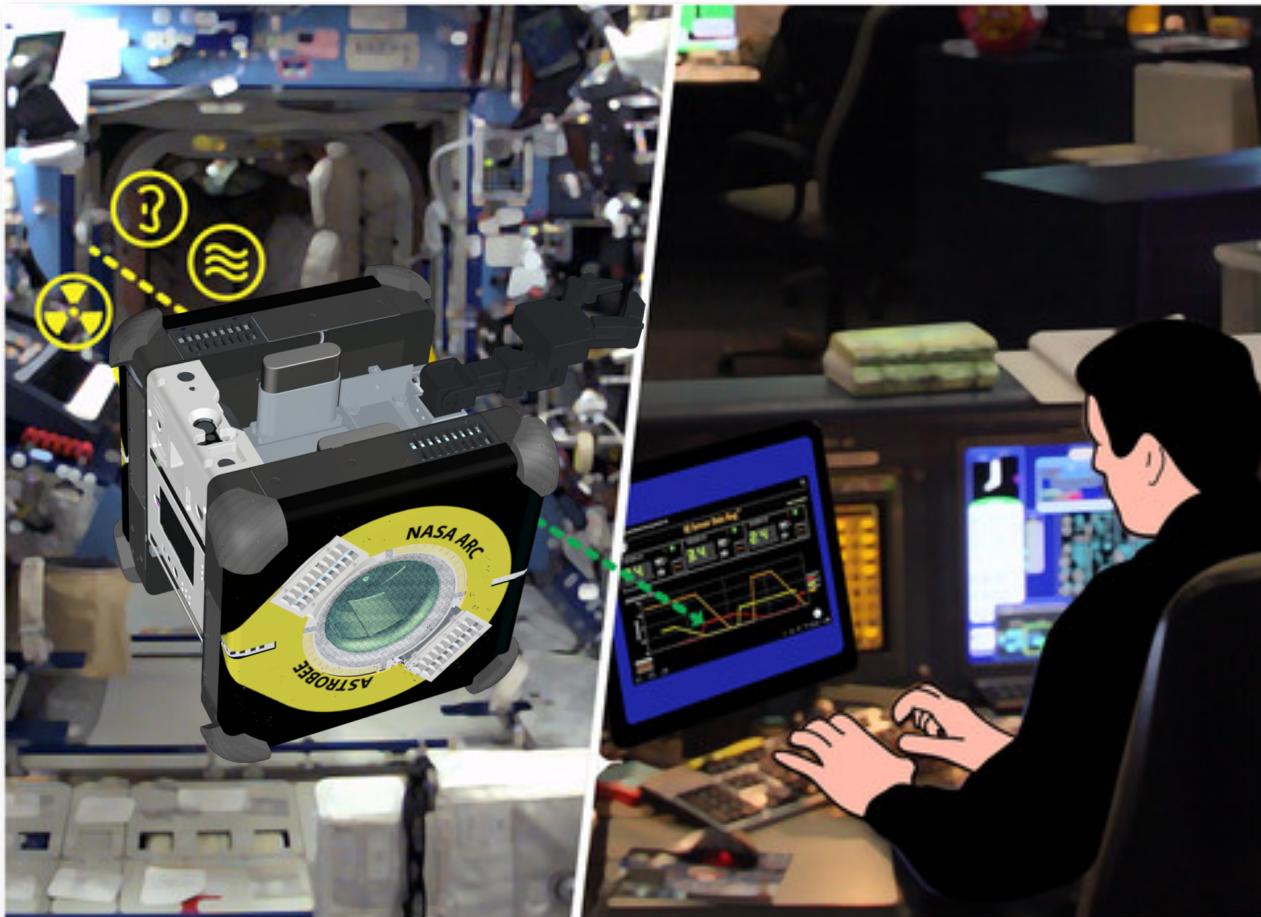
# Astrobee on the Space Station (concept)



# Astrobee on the Space Station (concept)



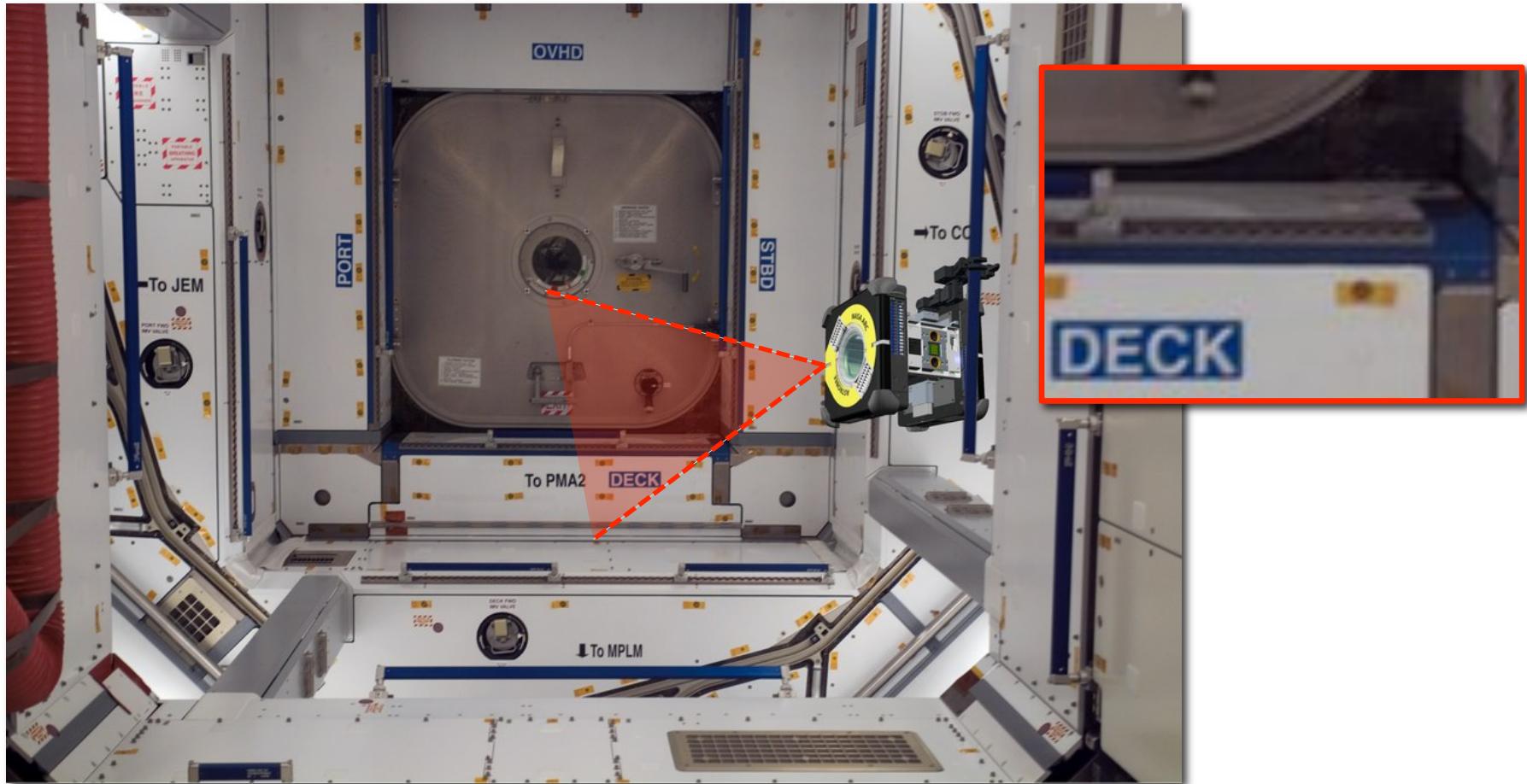
# Mobile Sensor



**Mission control remotely operates robot to perform ...**

- Inventory (RFID tag scanning)
- Environment surveys (air quality, sound levels, etc)

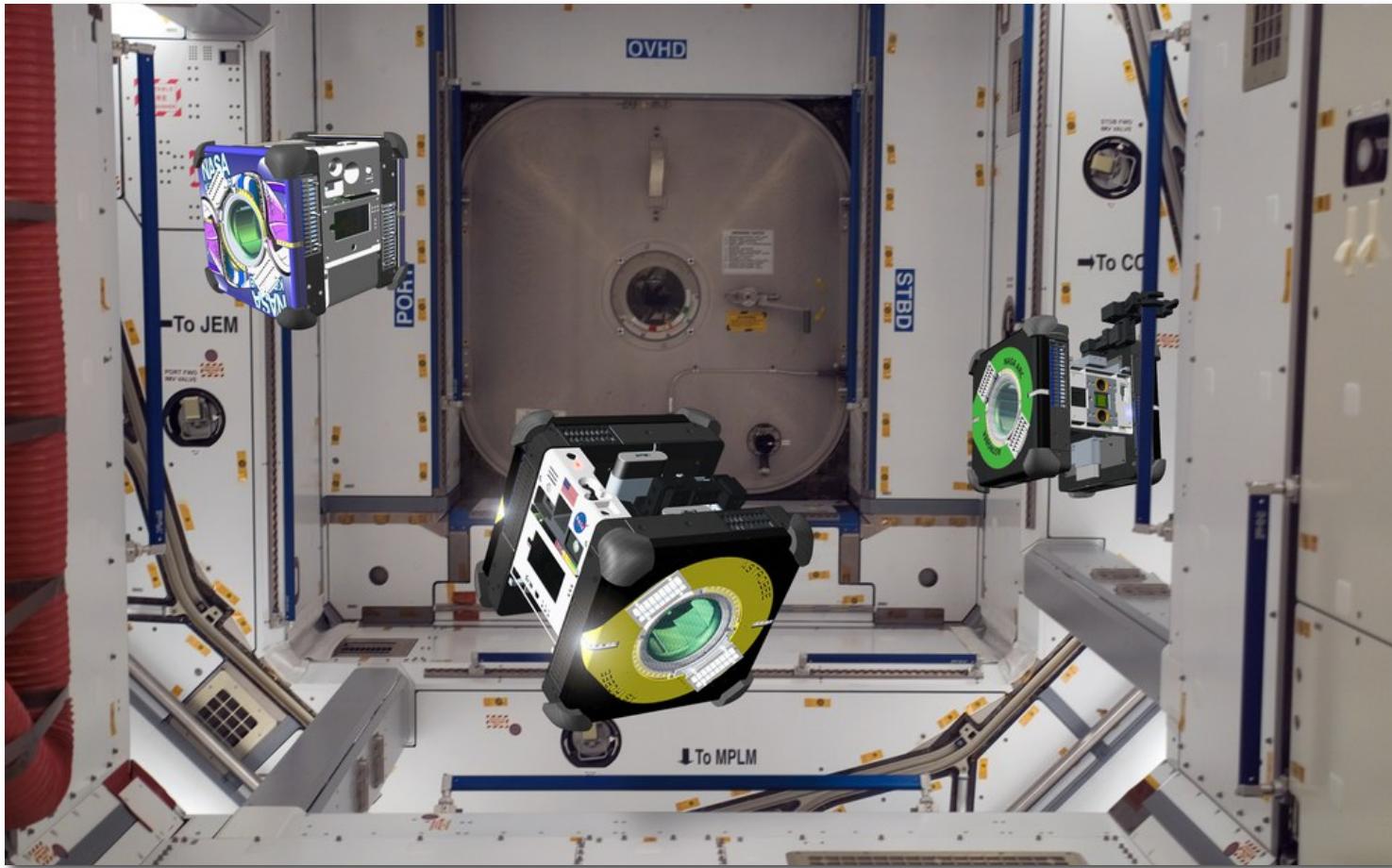
# Mobile Camera



**Mission control remotely operates robot as a mobile camera to:**

- Support astronaut work
- Better understand conditions inside the Space Station

# Zero-G Robotic Research



**Engineers, researchers, & students can use Astrobee for experiments**

- New payloads – sensors, mechanisms, etc.
- New software – control, human-robot interaction, perception, etc.

# Lab Testing



June 2016

*Dock release and control software testing at NASA Ames*

# Why “Astrobee”?

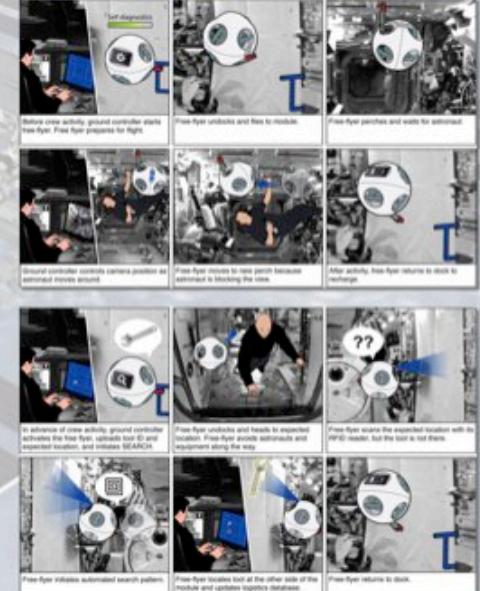


NASA National Aeronautics and Space Administration

Ames Discovery Innovations Solutions

## ROBOT NAME AND MISSION PATCH CONTEST

- Help **name** a new robot for the Space Station and design a **mission patch** !!!
- NASA Ames is developing a new free-flying robot that will be used inside the International Space Station.
- This robot will do many things, including:
  - Conduct zero-gravity experiments
  - Perform inventory using a Radio Frequency IDentification (RFID) reader
  - Carry cameras and sensors to monitor the space station environment
- For contest details and to enter, visit:  
 [robots.topcoder.com](http://robots.topcoder.com)  
**DEADLINE: October 22, 2014**



NEW YORK OCTOBER 9-12, 2014  
**COMIC CON**™



## TopCoder challenge

- Announced at NY ComicCon
- 818 registrants (record for this type of challenge)